

**Method and apparatus for controlled reaction in a reaction matrix.**

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Applicant:

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B01J8/02; B01J12/00; F23C99/00; F23D14/46;  
F23G7/06; F23N1/02; F24H1/00; F23N5/02; (IPC1-7):  
F23C11/00

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Method and apparatus are provided for establishing and controlling the stability and movement of a reaction wave of reacting gases in a matrix of solid heat-resistant matter, wherein such reacting gases may be recuperatively preheated. At least a portion of the bed is initially preheated above the autoignition temperature of the mixture whereby the mixture reacts upon being introduced into the matrix thereby initiating a self-sustaining reaction region, after which the pre-heating can be terminated. The stability and movement of the wave within the matrix is maintained by monitoring the temperatures along the flowpath of the gases through the bed and adjusting the flow of the gases and/or vapors or air to maintain and stabilize the wave in the bed. The method and apparatus provide for the reaction or combustion of gases to minimize NO<sub>x</sub> and undesired products of incomplete combustion. A recuperative heat exchange system may be used to preheat the reactants with heat generated by the reaction by channeling hot exhaust gases through the matrix surrounding reactant inlet tubes. The inlet tubes are thermally conducting and contain an interior matrix. The matrices interior to and surrounding the inlet tubes promote radiative heat transfer.

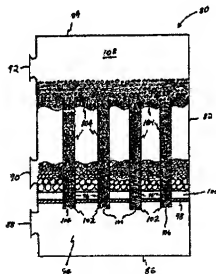


FIG. 11.

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